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Integrated Measurements of Soil Moisture over an Experimental Transect

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Understanding the spatial variability of soil moisture is essential to better investigate on the hydrological processes and on the role played by vegetation in land surface-atmosphere interactions. Several studies showed that soil moisture content can be deduced from electrical resistivity measurements that depends on the physical characteristics of soil such as: texture, salt and water content. In the present work, the aim is to compare different electrical resistivity tomography (ERT) and time-domain reflectometry (TDR) measurements of soil moisture, during dry and wet seasons, over a hillslope transect of the experimental basin of “Fiumarella of Corleto”, located in Southern of Italy.

Point measurements of soil moisture content were made with instrumental apparatus composed by a TDR100 system connected, through three multiplexters, to 22 probes that are located in 11 sampling sites at two different depths: 30 and 60 cm. The datalogger is represented by a CR10 that transmits the soil moisture values, elaborated by the TDR100, in real time by GSM network. The installation covers a transect of about 60 meters and the sampling time frequency is of 1 hour. The electrical resistivity tomography (ERT) measurements were performed using three arrays (Wenner, Schlumberger, and double dipole) along the monitored transect in different seasons of the year.

The soil moisture data recorded through the TDR probes seem to show a substan-

tial agreement with the electrical resistivity measurements, but a distinct behaviour is observed in presence of vegetation. The combination of techniques should lead to improve the reliability of soil moisture measurements in the spatial domain.